Sub A1

1. An apparatus for chemical mechanical polishing, comprising:

a platen to support a polishing surface;

an eddy current monitoring system positioned in the platen to generate a first signal;

an optical monitoring system positioned in the platen to generate a second signal;

circuitry in the platen to combine the first and second signals into a third signal on an output line; and

a computer to receive the third signal on the output line and extract the first and second signals.

2. The apparatus of claim 1, wherein the platen is rotatable.

3. The apparatus of claim 2, further comprising a rotary electrical union, and wherein the output line passes through the rotary electrical union between the circuitry and the computer.

4. The apparatus of claim 1, further comprising a carrier head to hold a substrate in contact with the polishing surface.

5. The apparatus of claim 1, wherein the circuitry assembles data from the first and second signals into packets, and the computer extracts the data from the packets.

6. A method of determining the thickness of a polishing pad, comprising:

positioning a substrate having a conductive layer disposed thereon in contact with a polishing surface of a polishing pad;

generating an alternating magnetic field from an inductor to induce eddy currents in the conductive layer;

measuring a strength of the magnetic field; and

calculating a thickness of the polishing pad from at least the strength of the magnetic field.

7. The method of claim 6, wherein generating the alternating magnetic field includes driving the inductor with a drive signal, and further comprising measuring a

phase difference between the magnetic field and the drive signal.

8. The method of claim 7, wherein the thickness of the polishing pad is calculated from at least the strength of the magnetic field and the phase difference.

9. The method of claim 6, further comprising polishing a test substrate with a first polishing pad having a first known thickness and with a second polishing pad having a second known thickness, and generating at least one coefficient to relate the thickness of the polishing pad to the strength of the signal during polishing.

10. The method of claim 6, further comprising alerting a user if the thickness of the polishing pad falls below a predetermined thickness.

11. A method of measuring a thickness of a conductive layer on a substrate during chemical mechanical polishing, comprising:

positioning a substrate having a conductive layer disposed thereon in contact with a polishing surface of a polishing pad;

creating relative motion between the substrate and the polishing pad to polish the substrate;

driving an inductor with a drive signal to generate an alternating magnetic field that induces eddy currents in the conductive layer;

measuring a strength of the magnetic field and a phase difference between the magnetic field and the drive signal;

calculating a correction factor based on the strength of the magnetic field; and

calculating a thickness of the conductive layer from the phase difference and the correction factor.

12. The method of claim 11, further comprising calculating a thickness of the polishing pad from at least the strength of the magnetic field.

13. The method of claim 12, further comprising polishing a test substrate with a first polishing pad having a first known thickness and with a second polishing pad having a second known thickness, and generating at least one coefficient to relate the thickness of the polishing pad to the strength of the signal during polishing.

14. The method of claim 12, further comprising polishing a test substrate with a first polishing pad when the first polishing pad has a first known thickness, polishing the test substrate with the first polishing pad when the first polishing pad has a second known thickness, and generating at least one coefficient to relate the thickness of the polishing pad to the strength of the signal during polishing.

15. The method of claim 12, further comprising alerting a user if the thickness of the polishing pad falls below a predetermined thickness.

16. A chemical mechanical polishing apparatus, comprising:

a polishing surface;

a carrier head to hold a substrate having a conductive layer disposed thereon in contact with the polishing surface;

a motor to create relative motion between the substrate and the polishing surface;

an eddy current monitoring system including an inductor and a current source to drive the inductor to generate an alternating magnetic field that induces eddy currents in the conductive layer;

a sensor to measure a strength of the magnetic field and a phase difference between the magnetic field and the drive signal; and

a computer configured to calculate a correction factor based on the strength of the magnetic field and calculate a thickness of the conductive layer from the phase difference and the correction factor.

17. An apparatus for chemical mechanical polishing, comprising:

a platen to support a polishing surface;

a carrier head to hold a substrate;

an eddy current monitoring system to generate a first signal during polishing, the eddy current monitoring system including an inductor to generate a magnetic field that extends to a first region of the substrate;

an optical monitoring system positioned to generate a second signal during polishing, the optical monitoring system including a light source, the light source positioned and oriented to direct a light beam to a spot in the first region of the substrate so that the eddy current monitoring system and optical monitoring system measure

substantially the same location on the substrate.

18. The apparatus of claim 17, wherein the eddy current monitoring system includes a core having a plurality of prongs and the optical monitoring system includes a detector positioned at least partially between the prongs.

19. The apparatus of claim 18, wherein the light beam impinges the substrate at a point substantially equidistant from the prongs.

20. The apparatus of claim 17, wherein the eddy current monitoring system includes a core and the light beam impinges the substrate at a spot directly above the core.